UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,518	02/24/2004	John H. Greinwald JR.	CHMC17.001CP1	2735

20995 7590 10/20/2006

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
CHO, DAN SUNG C	

ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/786,518	GREINWALD ET AL.	
	Examiner	Art Unit	
	Dan-Sung C. Cho	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *1-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :8/7/06, 9/23/05, 6/23/05, 10/13/04, 2/24/04.

Detailed Action

1. This action is in response to the papers filed on 8/7/2006. Currently, claims 1-23 are pending. Claims 1-16 have been withdrawn as drawn to non-elected subject matter. Applicants elected Claims 17-23, drawn to a microarray and kits with said microarray, without traverse on the paper dated 8/7/2006. Furthermore, Applicants elected the combination of genetic sequences from CDH23, MYO7A, OTOF, SLC26A4 and USH2A.

2. Because Groups I and II have been appropriately restricted and the applicant elected Group II and the combination of CDH23, MYO7A, OTOF, SLC26A4 and USH2A without traversal, the restriction and election/restriction is made FINAL.

Priority

3. This application is a CIP of 10/373,978 filed on 2/24/2003.

Summary of Claims

4. Claims 1-23 are pending.

Claims 1-16 are withdrawn.

Claims 17-23 are under consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Affimetrix catalog (2002 edition). The HG-U133 Plus 2.0 Array contains all five genes, namely, CDH23, MYO7A, OTOF, SLC26A4 and USH2A.

6. Claim 17, reciting, "selected from the group consisting of genetic sequences from CDH23, MYO7A, OTOF, SLC26A4", is rejected because the Affimetrix HG-U133 Plus 2.0 Array contains probe sets for CDH23 (probe sets 224527_at, 1552436_a_at, 232845_at and 232846_s_at), MYO7A (208189_s_at, 211103_at, 211104_s_at and 33197_at), OTOF (1555251_a_at and 220492_s_at), SLC26A4 (206529_X_at and 242271_at) and USH2A (207706_at).

7. Claim 18, reciting, "wherein said sequences comprise multiple adjacent exons", is rejected because the Affimetrix HG-U133 Plus 2.0 Array contains probe sets that detect multiple adjacent exons. For example, Probe set 211104_s_at detects multiple adjacent MYO7A exons 24, 25 and 26. A probe set of Affimetrix HG-U133 Plus 2.0 Array contains multiple oligonucleotide sequences that as a whole can detect multiple target exons within a target sequence.

8. Claim 19, reciting, "said multiple adjacent exons are selected from the group comprising CDH23 exons 2-3, CDH23 exons 4-6, CDH23 exons 7-9, CDH23 exons 10-11, ...", is rejected because the Affimetrix HG-U133 Plus 2.0 Array contains probe sets that detect multiple adjacent exons such as Probe set 211104_s_at that detects MYO7A exons 24-26. Another probe set 224527_at detects exons 67-69. Because the claim recites "said multiple adjacent exons are selected from the group comprising" of the

recited exons, and the Probe set 21104_s_at encompasses a multiple adjacent exons, all the limitations of the recited claim are met.

9. Claim 20, reciting, "said sequences comprise a single exon" is rejected because the Affimetrix HG-U133 Plus 2.0 Array contains probe sets that detect a single exon. For example, Probe set 33197_at detects a single exon, MYO7A exon 48; 220492_s_st, OTOF exon 47.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. (Williamson, R., Curator, Deafness Gene Mutation Database, URL:

http://hearing.harvard.edu/db/genelist.htm, last updated 9/18/2002) in view of Guo et al., (Guo et at., 2002, Oligonucleotide Arrays for High-Throughput SNPs Detection in the MHC Class I Genes: HLA-B as a Model System, Genome Res., Vol. 12: 447-457).

12. Williamson teaches Deafness Gene Mutation Database that lists data and links for many of the known genes, mutations and their exon locations for hereditary hearing impairment. The current list, which was last updated on 9/18/2002, includes CDH23, MYO7A, OTOF, SLC26A4 and USH2A. Williamson teaches, for example, multiple SNPs on USH2A that are associated with Usher Syndrome, a hereditary hearing impairment characterized by having symptoms of hearing impairment and retinitis pigmentosa. The MYO7A mutations are on exons 2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 16, 17, 21, 22, 23, 25, 28, 29, 30, 31, 35, 36, 37, 38, 39, 10, 41, 44, 45, 46, 47-49, 48, 49; USH2A mutations on exons 2, 3, 4, 6, 7, 9, 10, 11, 12, 13, 14, 18, 20, and 21; and OTOF on 8/9, 15, 16, 18, 39, and 48.

13. With regard to claim 17, reciting "A diagnostic hearing loss microarray comprising at least 5 sequences that are indicative of presence or absence of an allele associated with a risk for hearing loss", Williamson does not teach an array.

14. With regard to claim 18, reciting "multiple adjacent exons", Williamson does not teach an array with elements comprising of multiple adjacent exons.

15. With regard to claim 19, reciting "multiple adjacent exons are selected from the group comprising CDH23 exons 2-3, CDH23 exons 4-6, CDH23 exons 7-9, CDH23 exons 10-11, CDH23 exons 12-13, CDH23 exons 14-16, CDH23 exons 17-21, CDH23 exons 22-27, CDH23 exons 28-31, CDH23 exons 32-36, CDH23 exons 37-43, CDH23

exons 44-46, CDH23 exons 47-53, CDH23 exons 53-68, MYO7A exons 5-14, MYO7A exons 16-21, MYO7A exons 16-18, MYO7A exons 22-26, MYO7A exons 28-35, MYO7A exons 36-44, MYO7A exons 45-49, OTOF exons 4-5, OTOF exons 6-8, OTOF exons 9-11, OTOF exons 12-25, OTOF exons 16-25, OTOF exons 16-18, OTOF exons 16-20, OTOF exons 19-20, OTOF exons 21-25, OTOF exons 16-39, OTOF exons 26-39, OTOF exons 40-47, SLC26A4 exons 1-3, SLC26A4 exons 4-6, SLC26A4 exons 11-18, SLC26A4 exons 19-21, USH2A exons 1-3, USH2A exons 5-9, USH2A exons 10-11, USH2A exons 12-13, USH2A exons 15-16 and USH2A exons 17-20", Williamson does not teach an array with elements comprising of multiple adjacent exons recited in the claim.

16. With regard to claim 20, reciting "said sequences comprise a single exon", Williamson does not teach an array with elements comprising of a single exon.

17. With regard to Claim 21, reciting "The microarray of Claim 20, wherein said single exon is selected from the group consisting of MYO7A exon 1 MYO7A exon 2, MYO7A exon 3, MYO7A exon 4, MYO7A exon 15, MYO7A exon 21, MYO7A exon 27, OTOF exon 1, OTOF exon 2, OTOF exon 3, USH2A exon 4, USH2A exon 14 and USH2A exon 21", Williamson does not specifically teach a diagnostic hearing loss microarray with recited individual single exon.

18. With regard to Claim 22, reciting "A kit for detecting a candidate gene responsible for hearing loss a microarray", Williamson does not teach a diagnostic hearing loss microarray.

19. With regard to Claim 23, reciting "The kit of Claim 22, wherein the microarray comprises a solid support ...", Williamson does not teach a microarray.

20. However, Guo teaches exon-specific array with 68 oligonucleotide probes for polymorphisms in exon 2 and 69 for the adjacent exon 3 of human major histocompatibility complex (MHC) using HLA-B as a model system (page 448, left column, paragraph 2). Probes are further grouped into 15 regions for exon 2 and 13 regions for exon 3 (Table 1). Guo teaches further that the exon-specific probes provide unambiguous detection of complex heterozygous SNP combinations (Abstract) in a blind genotype study with 100 samples where correct interpretation of the array hybridization patterns are made for all three homozygous samples and all 97 heterozygous samples (page 455, left column, lines 6-14). Guo teaches solid-support (page 456, left column, paragraph 2), capture probe (page 456, left column, paragraph 2) and hybridization (page 456, right column, Hybridization Conditions). Guo teaches therefore use of exon specific array that can detect single exon as each probe is specific to a SNP in either exon 2 or 3 (page 448, left column, paragraph 2), and simultaneous detection of two ad

21. Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention was made to detect SNPs relevant to a human hearing loss associated genes and mutations taught by Williamson by adapting the simultaneous detection of such SNPs in an exon specific array format taught by Guo. Because the instant application and Guo are drawn to same method, namely a method for discriminating multiple human alleles relevant to a human disorder, one of ordinary

skill in the art would have been motivated to adapt the exon-specific array for SNP genotyping of hearing loss-related genes. Guo in that oligonucleotide arrays "afford a much higher throughput, by virtue of parallel analysis of multiple genetic regions" (page 455, left column, first paragraph in Discussion); and "a cost-effective approach for high-throughput polymorphism analysis" (page 447, right column, paragraph 1). Therefore the skilled artisan would have been motivated to have polymorphism taught by Williamson arrayed in a single array for cost effective and high throughput analysis, simultaneously detecting multiple SNPs associated with a human hearing loss.

Conclusion

22. No claims are allowable over the art.

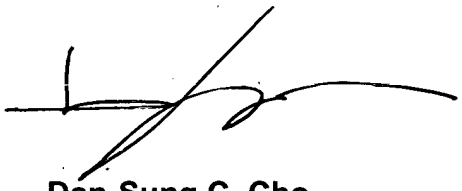
22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Dan-Sung C. Cho whose telephone number is (571) 272-9933. The examiner can normally be reached Monday-Friday from 7:00 a.m. to 4:00 p.m.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla, can be reached on (571) 272-0735.

24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

25. The Central Fax Number for official correspondence is (571) 273-8300.



Dan-Sung C. Cho

Examiner

AU1634

October 12, 2006